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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

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**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

112740-545

U S APPLICATION NO (IF KNOWN, SEE 37 CFR

10/070890

INTERNATIONAL APPLICATION NO
PCT/DE00/01202

INTERNATIONAL FILING DATE
April 17, 2000

PRIORITY DATE CLAIMED
September 6, 1999

TITLE OF INVENTION

INPUT ELEMENT FOR A TELEPHONE

APPLICANT(S) FOR DO/EO/US

Holz auf der Heide, Bernd et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☒ is attached hereto (required only if not communicated by the International Bureau)
 - b. ☐ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4)
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☒ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409)
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter 2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4)
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4)
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Return Receipt Postcard

10/070890

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IN THE UNITED STATES ELECTED/DESIGNATED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5

PRELIMINARY AMENDMENT

APPLICANTS:	Michael Anft et al.	DOCKET NO.:	112740-545
SERIAL NO:		GROUP ART UNIT:	
FILED:		EXAMINER:	
INTERNATIONAL APPLICATION NO.:		PCT/DE00/01202	
INTERNATIONAL FILING DATE		17 April 2000	
INVENTION:	INPUT ELEMENT FOR A TELEPHONE		

Assistant Commissioner for Patents,
Washington, D.C. 20231

10

Sir:

Please amend the above-identified International Application before entry into the National stage before the U.S. Patent and Trademark Office under 35 U.S.C. §371 as follows:

15

In the Specification:

Please replace the Specification of the present application, including the Abstract, with the following Substitute Specification:

S P E C I F I C A T I O N

TITLE OF THE INVENTION

INPUT ELEMENT FOR A TELEPHONE

5

BACKGROUND OF THE INVENTION

The present invention relates to an input element or dialing element and an input device for a telephone; in particular, for a mobile telephone.

10 Dialing elements or operator controls both for a key telephone and a mobile telephone are known. Usually, the input or selection of menu items and/or numbers is made using a 12-key block and further keys for selecting other functions. The selection of the other functions is frequently made by sequentially pressing a key or a pair of keys (for example, by sequentially scrolling up or down), and then selecting via cursor keys.

15 A further known form of operator control of a mobile telephone is to use what is referred to as a Jog Dial, such as is implemented, for example, in newer mobile telephones from Sony and is described in the publication EP-A-0 797 336. Here, the Jog Dial is an actuator wheel which is arranged in the mobile telephone and has a rotary function and a pressing function. For example, by rotating the Jog Dial actuator wheel, it is possible to scroll through a menu or the numbers 0 - 9, a
20 confirmation of selection function of the function or number which is selected by the rotary movement being implemented by pressing on the wheel in the radial direction. The disadvantage with this solution is that this form of input takes too long, particularly in the case of relatively long telephone numbers, and leads to a comparatively high level of cognitive and motor stress.

25 Interactive displays are also proposed for miniaturized devices. In the document WO97/16912, a wrist watch with such a display is described. A disadvantage here is that, in order to activate individual points which are illustrated on the display, an additional pin is appropriately used (cf. page 2, lines 10 et seq.) in order, for example, to keep the size of the menu items small.

In addition, inputting or control by voice input is a further possible way of inputting data. For miniaturized devices, this form has not yet become ready for introduction to the market or is technically and financially still too costly.

5 Generally, the course of further miniaturization, the area on information and communications terminals, for example GSM and DECT telephones, which is available for the user interface is becoming smaller and smaller so that on future devices there will no longer be any space for the traditional twelve key block.

The present invention is, therefore, directed toward an input element and an input device which requires less space and avoids the disadvantages of the Jog Dial.

10

SUMMARY OF THE INVENTION

Thus, the input element according to the present invention has an input which includes a rotary function in two directions (i.e., forward and backward), and two key functions. The directions of movement for generating the key functions are arranged in a plane perpendicularly to the plane of rotation and are opposed to one another. According to the present invention, the input is formed by an actuator wheel which is capable of being tilted out of the plane of rotary movement on each side by exerting an appropriate pressure so that it is possible to speak of a pressing function or tilting function. The tilting causes an appropriate device to generate a signal, so that two possible signals are available.

20

The visualization or acknowledgement of the selection via elements which are provided in a circular shape (for example, illuminated numbers), in a way analogous to the rotary movement of the actuator wheel, is largely self-explanatory and promotes the generation of sensomotive abilities on the part of the user, which makes using the device easier overall in cognitive terms and faster in motor terms.

25

The movement of the actuator wheel is preferably freely rotating or provided with a stop, the rotary movement being capable of being latched or non-latched. These further features are respectively dependent on the particular application.

30

In addition, the input device according to the present invention which includes an actuator wheel can be coupled to a display to an input device, which display is cognitively compatible with the rotary movement of the actuator wheel.

The display preferably has a large area, particularly circular, on which the respective menus, submenus, menu items or numbers are arranged substantially on a circle so that a direct assignment is provided between the display and the actuator wheel for the user. The combination of the rotary movement of the actuator wheel and the display which is matched thereto facilitates and speeds up the selection and input operation and reduces perception errors.

For example, the selected entry or the selected number which are respectively represented on the display preferably can be actuated by pressing on one side of the actuator wheel transversely to the direction of rotation; i.e., with a first key function. By pressing on the other side of the actuator wheel transversely to the direction of rotation, it is possible to trigger a further function; for example, exiting from a menu (ESC) or the deletion of a character (Backspace) with a second key function.

The advantages of the solution according to the present invention are as follows:

Reduction of the space required in comparison with the traditional key solutions such as, for example, the 12-digit key block; and reduction of the probability of incorrect operator control operations such as frequently occur with an actuator wheel solution with a pressing function in the direction of rotation because the rotation of the actuator wheel always exerts a pressure in the axial direction of the actuator wheel which, under certain circumstances, triggers the key function. The complete decoupling of the rotary functions from the two pressing functions or key functions prevents inadvertent triggering of the key function. In addition, the display of the current selection via the circular arrangement is more concise and less easily confused than in known solutions.

In comparison with conventional actuator wheel solutions, a further key function is available as a result of which current dialog prompting, such as "Cursor up/down" or "OK" and "Escape", can be implemented without the arrangement of a further key which is difficult to operate or a complex Help structure, such as "Escape" as an illustrated menu item, permitting the solution according to the present invention to provide significantly more convenient user prompting. The

input device according to the present invention, therefore, integrates all the elements required for convenient user prompting in one input element.

Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Invention and
5 the Figures.

BRIEF DESCRIPTION OF THE FIGURES

Fig. 1 shows a basic view of the input element according to the present invention.

Fig. 2 shows a detailed view of a possible way of supporting the actuator
10 wheel of the input element in Fig. 1.

Fig. 3 shows the arrangement of an input element in a round housing.

Fig. 4 shows a plan view of the installed input element in Fig. 3.

Fig. 5 shows a first embodiment of a mobile telephone with an "analog"
display.

Fig. 6 shows a second embodiment of a mobile telephone with a "digital"
15 display.

Fig. 7 shows a third embodiment of a mobile telephone with a display with a large area.

Fig. 8 shows a further possible way of arranging the input element in a
20 mobile telephone.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 1 shows an input element according to the present invention which has an actuator wheel 11 which serves as the input. The actuator wheel 11 preferably is provided with ribbing. The actuator wheel is supported on an axle 12 and can
25 rotate in two opposite directions 13 and 14. In addition, the actuator wheel 11 can be tilted into a plane which is substantially perpendicular to the plane of the rotary movement. In other words, the actuator wheel 11 can be moved in the opposite directions 15 and 16; i.e., displaced or tilted by applying pressure. A pickup or sensor 17 is provided for determining the rotary movement. This pickup for the
30 measure and the direction of the rotary movement can be formed by a further actuator wheel. Other sensors which are based on electrical and/or optical methods

can be used. Sensors 18 and 19 are arranged on each side of the actuator wheel 11 in order to determine the pressing movement or tilting of the actuator wheel. These sensors can be, for example, momentary contact switches. Other sensors which are based on electrical and/or optical methods also can be used.

5 Fig. 2 shows a cross section through the input element. In order to be able to implement the two momentary contact functions of the input element, the actuator wheel 11 is pivotably supported on the axle 12 via a ball and socket joint or ball bearing 20. For example, the ball and socket joint 20 can be provided by giving the axle 12 an substantially ball-shaped configuration. The maximum tilting
10 angle can be defined by outwardly directed beveling of part of the internal face of the axle hole of the actuator wheel 11. In addition, the directions of the tilting movement or pressing movement 15 and 16 and the tilting sensors 18 and 19 are also shown.

 Fig. 3 shows how the actuator wheel 11, which can be moved in four
15 directions 13, 14, 15, 16, interacts with a circular display area of a circular mobile telephone 21.

 Fig. 4 shows a plan view of an actuator wheel 11 which is provided with a ribbing and has the directions of rotation 14 and 15, represented here by a two-ended arrow, and the tilting directions 15 and 16. The actuator wheel 11 is
20 arranged here in a section 22 of a mobile telephone (not illustrated). For example, the numbers 0, 1, ..., 9 can be actuated by turning in one direction 14, 15. Pressing the actuator wheel 11 in Figure 4 to the left triggers Escape/Back, while pressing to the right triggers OK/Enter.

 Fig. 5 shows a view of a first embodiment of a mobile telephone 21 with
25 what is referred to as an "analog" selection display. The mobile telephone has a circular shape which is referred to below as a display area on which menu symbols 23 and numbers 24 are arranged. Here, both the menu symbols and the numbers 24 are each arranged on a circle. The numbers 24 and the menu symbols 23 are backlit (for example, via corresponding LEDs), when they are selected. The selection is
30 made here via the input element which is arranged on the side of the mobile telephone 21, and from which part of the actuator wheel 11 projects, and is visible

here. In the center of the display area of the mobile telephone 21, there is also a display 25 which serves, for example, for representing the selected numerical sequence. In addition, the mobile telephone 21 has a carrying cord which is embodied as an antenna 26.

5 Fig. 6 shows a simplified version of a mobile telephone with what is referred to as a "digital" display. Here, only one selection display 27 is arranged on the display area of the mobile telephone 21. By turning and pressing the actuator wheel 11, a number or menu is selected and displayed on the display 25.

10 Fig. 7 shows a third embodiment of a circular mobile telephone 21. Here, the display area of the mobile telephone 21 is almost completely filled by a circular panel 29 which is formed by a filter, behind which a display 30 is arranged. On this display, the menu symbols 23 and the numbers (not illustrated here) are generated. The menu symbols 23 are also arranged on a circle here. The selection of a menu is performed via the laterally arranged actuator wheel 11. The display can be multi-
15 colored in order to achieve better visualization. One variant of this solution consists in only a small display for displaying the numbers being located behind the filter 29, and the menu symbols 23 being arranged directly on the filter 29, in which case they can be illuminated separately by an illumination device, such as LEDs, in order to clarify and display the respective selection.

20 Fig. 8 shows an embodiment of a mobile telephone 21 in which the actuator wheel is arranged in a recess 31 in the mobile telephone 21. In addition, a displaceable cover 32 is present. When the mobile telephone 21 is not in use, the cover can be pushed over the actuator wheel which is arranged in a countersunk fashion so that the actuator wheel 11 is protected. In addition, a use lock of the
25 actuator wheel can be connected to the cover.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.

ABSTRACT OF THE DISCLOSURE

An input element for a telephone for inputting data having two rotary functions in respectively opposite directions, and which also has two key functions which are independent of the rotary functions, the key functions being triggered by
5 a movement in a plane substantially perpendicular to the plane of the rotary movement. In addition, the input element preferably being coupled to a display with menu items or numbers being arranged essentially on a circle.

In the Claims

On page 8, cancel line 1 and substitute the following left hand justified heading therefor:

CLAIMS

5 Please cancel claims 1-12, without prejudice, and substitute the following claims therefor:

13. An input element for inputting data, comprising:
two rotary functions in opposite directions;

10 two key functions which are independent of the rotary functions, the key functions being triggered by a movement in a plane which is substantially perpendicular to a plane of the rotary movement; and

 an actuator wheel supported axially on a bearing so that tilting movement of the actuator wheel out of the plane of the rotary movement on both sides is made possible.

15

14. An input element for inputting data as claimed in claim 13, wherein the key functions are implemented by one of pressing functions and tilting functions.

20 15. An input element for inputting data as claimed in claim 13, wherein the bearing is a ball bearing.

25 16. An input element for inputting data as claimed in claim 13, further comprising two sensors for determining the tilting movement, the sensors being arranged on each side of the actuator wheel within a tilting range.

17. An input element for inputting data as claimed claim 13, wherein the actuator wheel rotates in one of a latching and a non-latching fashion.

30 18. An input element for inputting data as claimed in claim 13, wherein the actuator wheel rotates in a freely running fashion.

19. An input element for inputting data as claimed in claim 13, wherein the actuator wheel is provided with a stop.

5 20. An input element for inputting data as claimed in claim 13, further comprising a further sensor for determining the rotary movement and direction.

21. An input device, comprising:
an input element for inputting data, the input element including two rotary
10 functions in opposite directions and two key functions which are independent of the rotary functions, the key functions being triggered by a movement in a plane which is substantially perpendicular to a plane of the rotary movement, and further including an actuating wheel supported axially on a bearing so that tilting movement of the actuator wheel out of the plane of the rotary movement on both
15 sides is made possible; and
a display device for displaying at least one of menu items and numbers.

22. An input device as claimed in claim 21, wherein the display device has a large and substantially circular area.
20

23. An input device as claimed in claim 21, wherein the menu items and numbers are arranged substantially along a circle.

24. An input device as claimed in claim 21, wherein the display has at
25 least two different colors.

25. An input device as claimed in claim 21, wherein the input device is part of a mobile telephone.

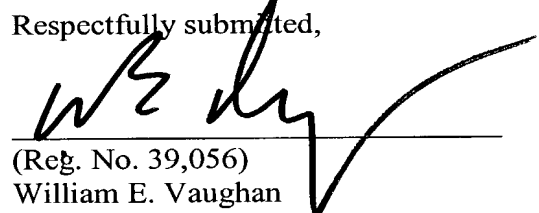
REMARKS

The present amendment makes editorial changes and corrects typographical errors in the specification, which includes the Abstract, in order to conform the specification to the requirements of United States Patent Practice. No new matter is added thereby. Attached hereto is a marked-up version of the changes made to the specification by the present amendment. The attached page is captioned "**Version With Markings To Show Changes Made**".

In addition, the present amendment cancels original claims 1-12 in favor of new claims 13-25. Claims 13-25 have been presented solely because the revisions by red-lining and underlining which would have been necessary in claims 1-12 in order to present those claims in accordance with preferred United States Patent Practice would have been too extensive, and thus would have been too burdensome. The present amendment is intended for clarification purposes only and not for substantial reasons related to patentability pursuant to 35 U.S.C. §§101, 102, 103 or 112. Indeed, the cancellation of claims 1-12 does not constitute an intent on the part of the Applicants to surrender any of the subject matter of claims 1-12.

Early consideration on the merits is respectfully requested.

Respectfully submitted,



(Reg. No. 39,056)
William E. Vaughan
Bell, Boyd & Lloyd LLC
P.O. Box 1135
Chicago, Illinois 60690-1135
(312) 807-4292
Attorneys for Applicants

VERSIONS WITH MARKINGS TO SHOW CHANGES MADE**In The Specification:**

The Specification of the present application, including the Abstract, has been amended as follows:

5

SPECIFICATION**TITLE OF THE INVENTION****INPUT ELEMENT FOR A TELEPHONE****BACKGROUND OF THE INVENTION**

The present invention relates to an input element or dialing element and an
10 input device for a telephone; in particular, for a mobile telephone.

Dialing elements or operator controls both for a key telephone and a mobile
telephone are known. Usually, the input or selection of menu items and/or numbers
is made using a ~~twelve~~ 12-key block and further keys for selecting other functions.
The selection of the other functions is frequently made by sequentially pressing a
15 key or a pair of keys, (for example, by sequentially scrolling up or down;), and then
selecting ~~by means of~~ via cursor keys.

A further known form of operator control of a mobile telephone is to use
what is referred to as a Jog Dial, such as is implemented, for example, in newer
mobile telephones from Sony and is described in the publication EP-A-0 797 336.
20 Here, the Jog Dial is an actuator wheel which is arranged in the mobile telephone
and has a rotary function and a pressing function. For example, by rotating the Jog
Dial actuator wheel, it is possible to scroll through a menu or the numbers 0 - 9, a
confirmation of selection function of the function or number which is selected by
the rotary movement being implemented by pressing on the wheel in the radial
25 direction. The disadvantage with this solution is that this form of input takes too
long, ~~in particular~~ particularly in the case of relatively long telephone numbers, and
leads to a comparatively high level of cognitive and motor stress.

Interactive displays are also proposed for miniaturized devices. In the
document WO97/16912, a wrist watch with such a display is described. A
30 disadvantage here is that, in order to activate individual points which are illustrated

on the display, an additional pin is appropriately used (cf. page 2, lines 10 et seq.) in order, for example, to keep the size of the menu items small.

In addition, inputting or control by voice input is ~~also a basic~~ a further possible way of inputting data. For miniaturized devices, this form has not yet
 5 become ready for introduction to the market or is technically and financially still too costly.

Generally, the course of further miniaturization, the area on information and communications terminals, for example GSM and DECT telephones, which is available for the user interface is becoming smaller and smaller so that on future
 10 devices there will no longer be any space for the traditional twelve key block.

The present invention is, therefore ~~based on the object of providing, directed toward~~ an input element and an input device which requires less space and avoids the disadvantages of the Jog Dial.

~~The object is achieved by means of the features of the input element according to claim 1, and the features of the input according to claim 10. Preferred refinements of the invention are the subject matter of the subclaims.~~

SUMMARY OF THE INVENTION

~~The~~ Thus, the input element according to the present invention has an input ~~means, the input means comprising~~ which includes a rotary function in two
 20 directions, ~~i.e.~~ (i.e., forward and backward), and two key functions. The directions of movement for generating the key functions are arranged in a plane perpendicularly to the plane of rotation and are opposed to one another. According to the present invention, the input means is formed by an actuator wheel, ~~the actuator wheel being~~ which is capable of being tilted out of the plane of rotary
 25 movement on each side by exerting an appropriate pressure so that it is possible to speak of a pressing function or tilting function. The tilting causes an appropriate device to generate a signal, so that two possible signals are available.

The visualization or acknowledgement of the selection ~~by means of~~ via elements which are provided in a circular shape; (for example, illuminated
 30 numbers), in a way analogous to the rotary movement of the actuator wheel, is largely self-explanatory and promotes the generation of sensomotive abilities on the

part of the user, which makes using the device easier overall in cognitive terms and faster in motor terms.

The movement of the actuator wheel is preferably freely rotating or provided with a stop, the rotary movement being capable of being latched or non-latched. These further features are respectively dependent on the particular application.

In addition, the input device according to the present invention which comprises includes an actuator wheel can be coupled to a display to an input device, which display is cognitively compatible with the rotary movement of the actuator wheel. The display is preferably ~~a display area of~~ has a large area, in particular particularly circular, on which the respective menus, submenus, menu items or numbers are arranged ~~essentially~~ substantially on a circle so that a direct assignment is provided between the display and the actuator wheel for the user. The combination of the rotary movement of the actuator wheel and the display which is matched thereto facilitates and speeds up the selection and input operation and reduces perception errors.

For example, the selected entry or the selected number which are respectively represented on the display ~~can~~ preferably can be actuated by pressing on one side of the actuator wheel transversely to the direction of rotation; i.e., with a first key function. By pressing on the other side of the actuator wheel transversely to the direction of rotation, it is possible to trigger a further function; for example, exiting from a menu (ESC) or the deletion of a character (Backspace); ~~i.e.~~ with a second key function.

The advantages of the solution according to the present invention are as follows:

Reduction of the space required in comparison with the traditional key solutions such as, for example, the 12-digit key block; and reduction ~~twelve-digit~~ ~~key block~~;

~~Reduction~~ of the probability of incorrect operator control operations such as frequently occur with an actuator wheel solution with a pressing function in the direction of rotation because the rotation of the actuator wheel always ~~also~~ exerts a

pressure in the axial direction of the actuator wheel, which, under certain circumstances, triggers the key function. The complete decoupling of the rotary functions from the two pressing functions or key functions prevents inadvertent triggering of the key function. In addition, the display of the current selection by
 5 ~~means of~~ via the circular arrangement is more concise and less easily confused than in known solutions.

In comparison with conventional actuator wheel solutions, a further key function is available as a result of which current dialog prompting, ~~for example~~ such as "Cursor up/down" or "OK" and "Escape", can be implemented without the
 10 arrangement of a further key which is difficult to operate or a complex Help structure, ~~for example~~ such as "Escape" as an illustrated menu item, permitting the solution according to the present invention to provide significantly more convenient user prompting. The input device according to the present invention, therefore, integrates all the elements required for convenient user prompting in one input
 15 element.

Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Invention and the Figures.

BRIEF DESCRIPTION OF THE FIGURES

20 ~~Preferred embodiments of the invention are explained below with reference to the drawings, in which:~~

Fig. 1 shows a basic view of the input element according to the present invention.

Fig. 2 shows a detailed view of a possible way of supporting the actuator
 25 wheel of the input element in Fig. 1.

Fig. 3 shows the arrangement of an input element in a round housing.

Fig. 4 shows a plan view of the installed input element in Fig. 3.

Fig. 5 shows a first embodiment of a mobile telephone with an "analog"
 display.

30 Fig. 6 shows a second embodiment of a mobile telephone with a "digital" display.

Fig. 7 shows a third embodiment of a mobile telephone with a display with a large area, ~~and~~.

Fig. 8 shows a further possible way of arranging the input element in a mobile telephone.

5

DETAILED DESCRIPTION OF THE INVENTION

Fig. 1 shows an input element according to the present invention which has an actuator wheel 11 which serves as the input means. The actuator wheel 11 is preferably is provided with ribbing. The actuator wheel is supported on an axle 12 and can rotate in two opposite directions 13 and 14. In addition, the actuator wheel 11 can be tilted into a plane which is ~~essentially~~ substantially perpendicular to the plane of the rotary movement. In other words, the actuator wheel 11 can be moved in the opposite directions 15 and 16; i.e., displaced or tilted by applying pressure. A pickup or sensor 17 is provided for determining the rotary movement. This pickup for the measure and the direction of the rotary movement can be formed by
15 a further actuator wheel. Other sensors which are based on electrical and/or optical methods can be used. Sensors 18 and 19 are arranged on each side of the actuator wheel 11 in order to determine the pressing movement or tilting of the actuator wheel. These sensors can be, for example, momentary contact switches. Other sensors which are based on electrical and/or optical methods ~~can~~ also can be used.

20

Fig. 2 shows a cross section through the input element. In order to be able to implement the two momentary contact functions of the input element, the actuator wheel 11 is pivotably supported on the axle 12 ~~by means of~~ via a ball and socket joint or ball bearing 20. For example, the ball and socket joint 20 can be provided by giving the axle 12 an ~~essentially~~ substantially ball-shaped
25 configuration. The maximum tilting angle can be defined by outwardly directed beveling of part of the internal face of the axle hole of the actuator wheel 11. In addition, the directions of the tilting movement or pressing movement 15 and 16 and the tilting sensors 18 and 19 are also shown.

Fig. 3 shows how the actuator wheel 11, which can be moved in four
30 directions 13, 14, 15, 16, interacts with a circular display area of a circular mobile telephone 21.

Fig. 4 shows a plan view of an actuator wheel 11 which is provided with a ribbing and has the directions of rotation 14 and 15, represented here by a two-ended arrow, and the tilting directions 15 and 16. The actuator wheel 11 is arranged here in a section 22 of a mobile telephone (not illustrated). For example, the numbers 0, 1, ..., 9 can be actuated by turning in one direction 14, 15. Pressing the actuator wheel 11 in the figure Figure 4 to the left triggers Escape/Back, while pressing to the right triggers OK/Enter.

Fig. 5 shows a view of a first embodiment of a mobile telephone 21 with what is referred to as an "analog" selection display, ~~the mobile telephone having a circular shape~~. The mobile telephone has a circular shape which is referred to below as a display area on which menu symbols 23 and numbers 24 are arranged. Here, both the menu symbols and the numbers 24 are each arranged on a circle. The numbers 24 and the menu symbols 23 are backlit, (for example ~~by means of~~, via corresponding LEDs), when they are selected. The selection is made here ~~by means of~~ via the input element which is arranged on the side of the mobile telephone 21, and from which part of the actuator wheel 11 projects, and is visible, here. In the center of the display area of the mobile telephone 21, there is also a display 25 which serves, for example, for representing the selected numerical sequence. In addition, the mobile telephone 21 has a carrying cord which is embodied as an antenna 26.

Fig. 6 shows a simplified version of a mobile telephone with what is referred to as a "digital" display. Here, only one selection display 27 is arranged on the display area of the mobile telephone 21. By turning and pressing the actuator wheel 11, a number or menu is selected and displayed on the display 25.

Fig. 7 shows a third embodiment of a circular mobile telephone 21. Here, the display area of the mobile telephone 21 is almost completely filled by a circular panel 29 which is formed by a filter, behind which a display 30 is arranged. On this display, the menu symbols 23 and the numbers (not illustrated here) are generated. The menu symbols 23 are also arranged on a circle here. The selection of a menu is performed ~~by means of~~ via the laterally arranged actuator wheel 11. The display can be multi-colored here in order to achieve better visualization. One variant of

this solution consists in only a small display for displaying the numbers being located behind the filter 29, and the menu symbols 23 being arranged directly on the filter 29, in which case they can be illuminated separately by an illumination device, ~~for example~~ such as LEDs, in order to clarify and display the respective selection.

Fig. 8 shows an embodiment of a mobile telephone 21 in which the actuator wheel is arranged in a recess 31 in the mobile telephone 21. In addition, a displaceable cover 32 is present. When the mobile telephone 21 is not in use, the cover can be pushed over the actuator wheel which is arranged in a countersunk fashion so that the actuator wheel 11 is protected. In addition, a use lock of the actuator wheel can be connected to the cover.

~~Patent claims~~ Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.

~~Abstract~~ ABSTRACT OF THE DISCLOSURE

~~Input element for a telephone~~

5 An input element for a telephone for inputting data having two rotary functions in respectively opposite directions, and which also has two key functions which are independent of the rotary functions, the key functions being triggered by a movement in a plane ~~essentially~~ substantially perpendicular to the plane of the rotary movement. In addition, the input element is preferably being coupled to a display; with menu items or numbers being arranged essentially on a circle.

10 [Fig. 1]

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- Interactive displays are also proposed for miniaturized devices. In the document W097/16912, a wrist watch with such a display is described. A disadvantage here is that, in order to activate individual points which are
- 5 illustrated on the display, an additional pin is appropriately used (cf. page 2, lines 10 et seq.) in order, for example, to keep the size of the menu items small.
- 10 In addition, inputting or control by voice input is also a basic further possible way of inputting data. For miniaturized devices this form has not yet become ready for introduction to the market or is technically and financially still too costly.

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Generally, the course of further miniaturization, the area on information and communications terminals, for example GSM and DECT telephones, which is available for the user interface is becoming smaller and smaller so
5 that on future devices there will no longer be any space for the traditional twelve key block.

The invention is therefore based on the object of providing an input element and an input device which
10 requires less space and avoids the disadvantages of the Jog Dial.

The object is achieved by means of the features of the input element according to claim 1, and the features of
15 the input according to claim 10. Preferred refinements of the invention are the subject matter of the subclaims.

The input element according to the invention has an
20 input means, the input means comprising a rotary function in two directions, i.e. forward and backward, and two key functions. The directions of movement for generating the key functions are arranged in a plane perpendicularly to the plane of rotation and are
25 opposed to one another. According to the invention, the input means is formed by an actuator wheel, the actuator wheel being capable of being tilted out of the plane of rotary movement on each side by exerting an appropriate pressure so that it is possible to speak of
30 a pressing function or tilting function. The tilting causes an appropriate device to generate a signal, so that two possible signals are available.

The visualization or acknowledgement of the selection
35 by means of elements which are provided in a circular shape, for example illuminated numbers, in a way

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analogous to the rotary movement of the actuator wheel,
is largely self-explanatory and promotes the generation
of sensomotive abilities on the part of the user, which
makes using the device easier overall in cognitive
5 terms and faster in motor terms.

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easier overall in cognitive terms and faster in motor terms.

5 The movement of the actuator wheel is preferably freely rotating or provided with a stop, the rotary movement being capable of being latched or non-latched. These further features are respectively dependent on the particular application.

10 In addition, the input device according to the invention which comprises an actuator wheel can be coupled to a display to an input device, which display is cognitively compatible with the rotary movement of the actuator wheel. The display is preferably a display
15 area of a large area, in particular circular, on which the respective menus, submenus, menu items or numbers are arranged essentially on a circle so that a direct assignment is provided between the display and the actuator wheel for the user. The combination of the
20 rotary movement of the actuator wheel and the display which is matched thereto facilitates and speeds up the selection and input operation and reduces perception errors.

25 For example, the selected entry or the selected number which are respectively represented on the display can preferably be actuated by pressing on one side of the actuator wheel transversely to the direction of rotation, i.e. with a first key function. By pressing
30 on the other side of the actuator wheel transversely to the direction of rotation, it is possible to trigger a further function, for example exiting from a menu (ESC) or the deletion of a character (Backspace), i.e. with a second key function.

35

The advantages of the solution according to the invention are as follows:

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Reduction of the space required in comparison with the traditional key solutions such as, for example, the twelve - digit key block,

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Reduction of the probability of incorrect operator control operations such as frequently occur with an actuator wheel solution with a pressing function in the direction of rotation because the rotation of the actuator wheel always also exerts a pressure in the axial direction of the actuator wheel, which under certain circumstances triggers the key function. The complete decoupling of the rotary functions from the two pressing functions or key functions prevents inadvertent triggering of the key function. In addition, the display of the current selection by means of the circular arrangement is more concise and less easily confused than in known solutions.

In comparison with conventional actuator wheel solutions, a further key function is available as a result of which current dialog prompting, for example "Cursor up/down" or "OK" and "Escape", can be implemented without the arrangement of a further key which is difficult to operate or a complex Help structure, for example "Escape" as an illustrated menu item, permitting the solution according to the invention to provide significantly more convenient user prompting. The input device according to the invention therefore integrates all the elements required for convenient user prompting in one input element.

Preferred embodiments of the invention are explained below with reference to the drawings, in which:

Fig. 1 shows a basic view of the input element according to the invention,

Fig. 2 shows a detailed view of a possible way of supporting the actuator wheel of the input element in Fig. 1,

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Fig. 3 shows the arrangement of an input element in a round housing,

Fig. 4 shows a plan view of the installed input
5 element in Fig. 3,

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Fig. 5 shows a first embodiment of a mobile telephone with an "analog" display,

5 Fig. 6 shows a second embodiment of a mobile telephone with a "digital" display,

Fig. 7 shows a third embodiment of a mobile telephone with a display with a large area, and

10 Fig. 8 shows a further possible way of arranging the input element in a mobile telephone.

Fig. 1 shows an input element according to the invention which has an actuator wheel 11 which serves
15 as input means. The actuator wheel 11 is preferably provided with ribbing. The actuator wheel is supported on an axle 12 and can rotate in two opposite directions 13 and 14. In addition, the actuator wheel 11 can be tilted into a plane which is essentially perpendicular
20 to the plane of the rotary movement. In other words, the actuator wheel 11 can be moved in the opposite directions 15 and 16, i.e. displaced or tilted by applying pressure. A pickup or sensor 17 is provided for determining the rotary movement. This pickup for
25 the measure and the direction of the rotary movement can be formed by a further actuator wheel. Other sensors which are based on electrical and/or optical methods can be used. Sensors 18 and 19 are arranged on each side of the actuator wheel 11 in order to
30 determine the pressing movement or tilting of the actuator wheel. These sensors can be, for example, momentary contact switches. Other sensors which are based on electrical and/or optical methods can also be used.

35

Fig. 2 shows a cross section through the input element. In order to be able to implement the two momentary contact functions of the input element, the actuator

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wheel 11 is pivotably supported on the axle 12 by means of a ball and socket joint or ball bearing 20. For example,

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the ball and socket joint 20 can be provided by giving the axle 12 an essentially ball-shaped configuration. The maximum tilting angle can be defined by outwardly directed beveling of part of the internal face of the axle hole of the actuator wheel 11. In addition, the directions of the tilting movement or pressing movement 15 and 16 and the tilting sensors 18 and 19 are also shown.

Fig. 3 shows how the actuator wheel 11, which can be moved in four directions 13, 14, 15, 16, interacts with a circular display area of a circular mobile telephone 21.

Fig. 4 shows a plan view of an actuator wheel 11 which is provided with a ribbing and has the directions of rotation 14 and 15, represented here by a two-ended arrow, and the tilting directions 15 and 16. The actuator wheel 11 is arranged here in a section 22 of a mobile telephone (not illustrated). For example, the numbers 0, 1, ..., 9 can be actuated by turning in one direction 14, 15. Pressing the actuator wheel 11 in the figure to the left triggers Escape/Back, while pressing to the right triggers OK/Enter.

Fig. 5 shows a view of a first embodiment of a mobile telephone 21 with what is referred to as an "analog" selection display, the mobile telephone having a circular shape. The mobile telephone has a circular shape which is referred to below as a display area on which menu symbols 23 and numbers 24 are arranged. Here, both the menu symbols and the numbers 24 are each arranged on a circle. The numbers 24 and the menu symbols 23 are backlit, for example by means of corresponding LEDs, when they are selected. The selection is made here by means of the input element which is arranged on the side of the mobile telephone

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21, and from which part of the actuator wheel 11 projects, and is visible, here. In the center of the display area of the mobile telephone 21, there is also a display 25 which serves, for example, for
5 representing

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the selected numerical sequence. In addition, the mobile telephone 21 has a carrying cord which is embodied as an antenna 26.

5 Fig. 6 shows a simplified version of a mobile telephone with what is referred to as a "digital" display. Here, only one selection display 27 is arranged on the display area of the mobile telephone 21. By turning and pressing the actuator wheel 11, a number or menu is
10 selected and displayed on the display 25.

Fig. 7 shows a third embodiment of a circular mobile telephone 21. Here, the display area of the mobile telephone 21 is almost completely filled by a circular
15 panel 29 which is formed by a filter, behind which a display 30 is arranged. On this display, the menu symbols 23 and the numbers (not illustrated here) are generated. The menu symbols 23 are also arranged on a circle here. The selection of a menu is performed by
20 means of the laterally arranged actuator wheel 11. The display can be multi-colored here in order to achieve better visualization. One variant of this solution consists in only a small display for displaying the numbers being located behind the filter 29, and the
25 menu symbols 23 being arranged directly on the filter 29, in which case they can be illuminated separately by an illumination device, for example LEDs, in order to clarify and display the respective selection.

30 Fig. 8 shows an embodiment of a mobile telephone 21 in which the actuator wheel is arranged in a recess 31 in the mobile telephone 21. In addition, a displaceable cover 32 is present. When the mobile telephone 21 is not in use, the cover can be pushed over the actuator
35 wheel which is arranged in a countersunk fashion so that the actuator wheel 11 is protected. In addition, a use lock of the actuator wheel can be connected to the cover.

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Patent claims

1. An input element for inputting data, the input
element having two rotary functions in opposite
5 directions,
- the input element (10) having two key functions
which are independent of the rotary functions,
the key functions being triggered by a movement
in a plane essentially perpendicularly to the
10 plane of the rotary movement, and
- the input element (10) having an actuator wheel
(11) which is supported axially on a bearing
(20) so that tilting of the actuator wheel (11)
out of the rotary plane on both sides is made
15 possible.
2. The input element as claimed in claim 1,
characterized in that the key functions are
implemented by pressing functions or tilting
20 functions.
3. The input element as claimed in one of the
preceding claims, characterized in that the
bearing (20) is a ball bearing.
25
4. The input element as claimed in one of the
preceding claims, characterized in that the input
element (10) has two sensors (18, 19) for
determining the tilting movement, which sensors
30 (18, 19) are arranged on each side of the actuator
wheel (11) within the tilting range.
5. An input element as claimed in one one of the
preceding claims, characterized in that the
35 actuator wheel (11) rotates in a latching or non-
latching fashion.

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6. The input element as claimed in one of one of the preceding claims, characterized in that the

actuator wheel (11) rotates in a freely running fashion or is provided with a stop.

5 7. The input element as claimed in one of the preceding claims, characterized in that the input element (10) has a sensor (17) for determining the rotary movement and direction.

10 8. An input device having an input element (11) defined in one of claims 1 to 7, and a display device (21) for displaying menu items and/or numbers.

15 9. The input device as claimed in claim 8, characterized in that the display device (21) has a large area and is preferably circular.

20 10. The input device as claimed in claim 8 or 9, characterized in that the menu items and/or numbers are arranged essentially along a circle.

25 11. The input device as claimed in one of claims 8-10, characterized in that the display has at least two different colors.

12. A telephone, in particular mobile telephone (21), having a input device which is defined as claimed in one of claims 8-11.

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Abstract

Input element for a telephone

An input element for inputting data having two rotary functions in respectively opposite directions, also has two key functions which are independent of the rotary functions, the key functions being triggered by a movement in a plane essentially perpendicular to the plane of the rotary movement. In addition, the input element is preferably coupled to a display, menu items or numbers being arranged essentially on a circle.

[Fig. 1]

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FIG 1

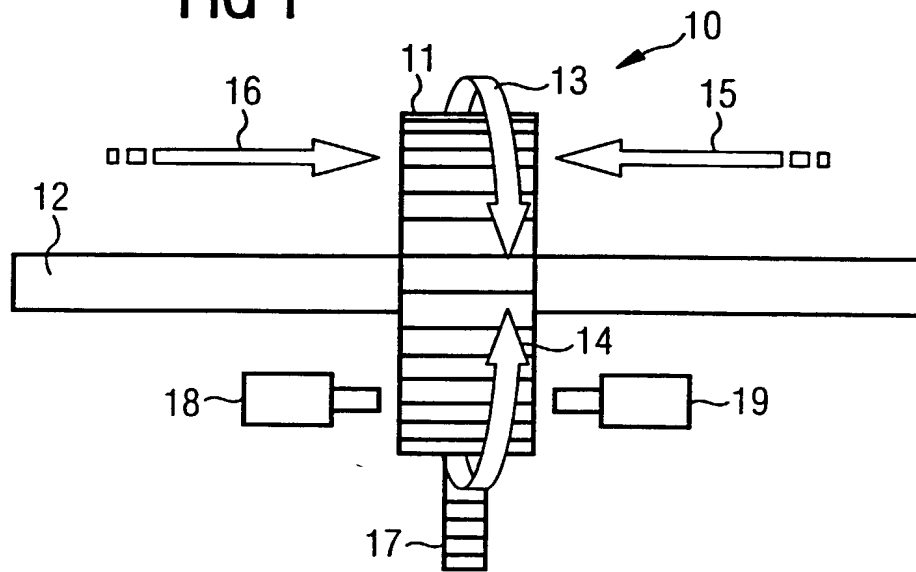
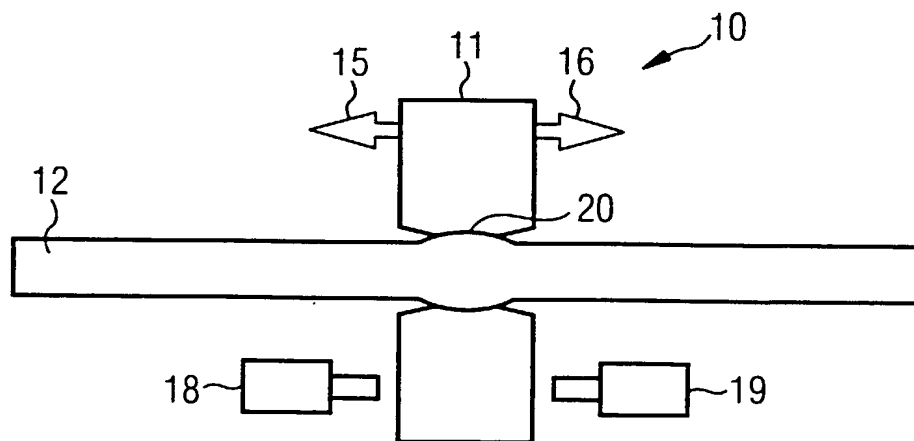


FIG 2



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FIG 3

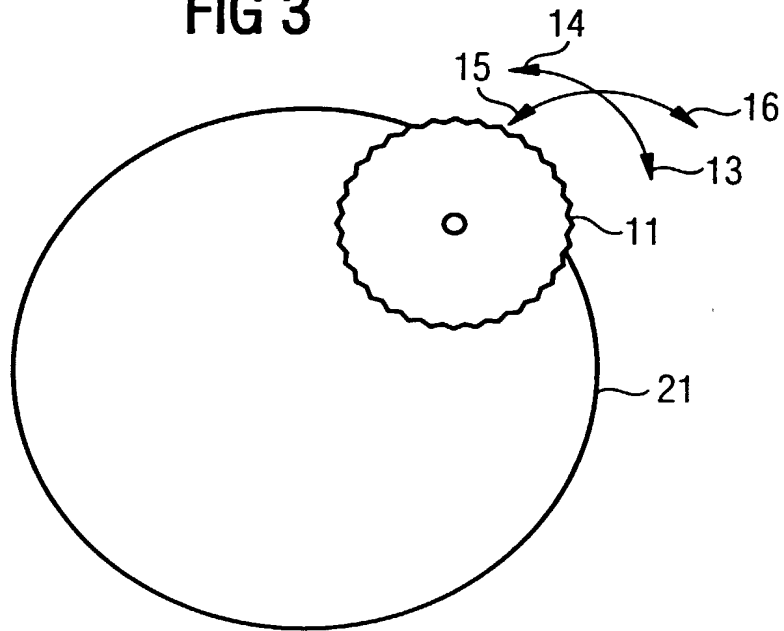
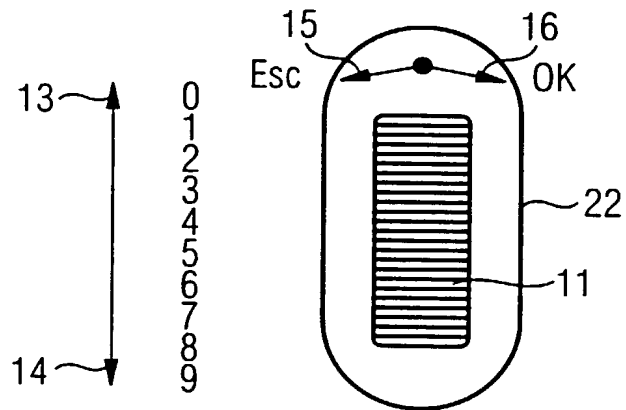
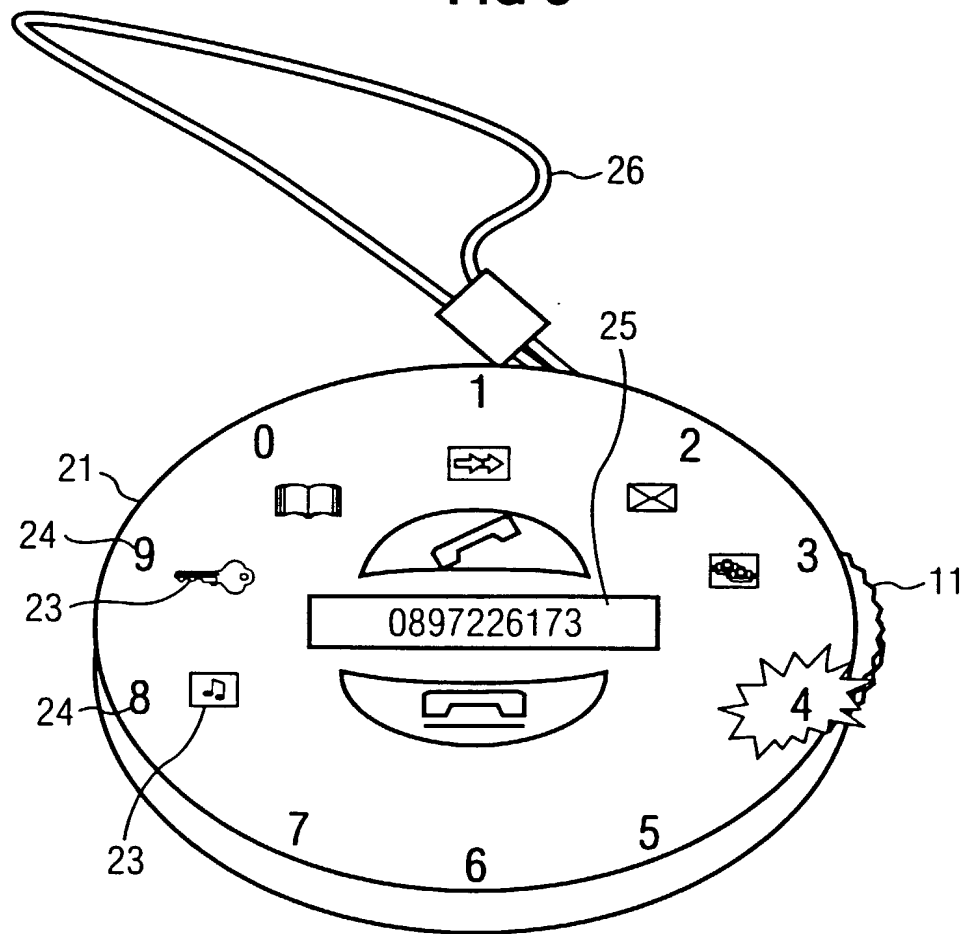


FIG 4



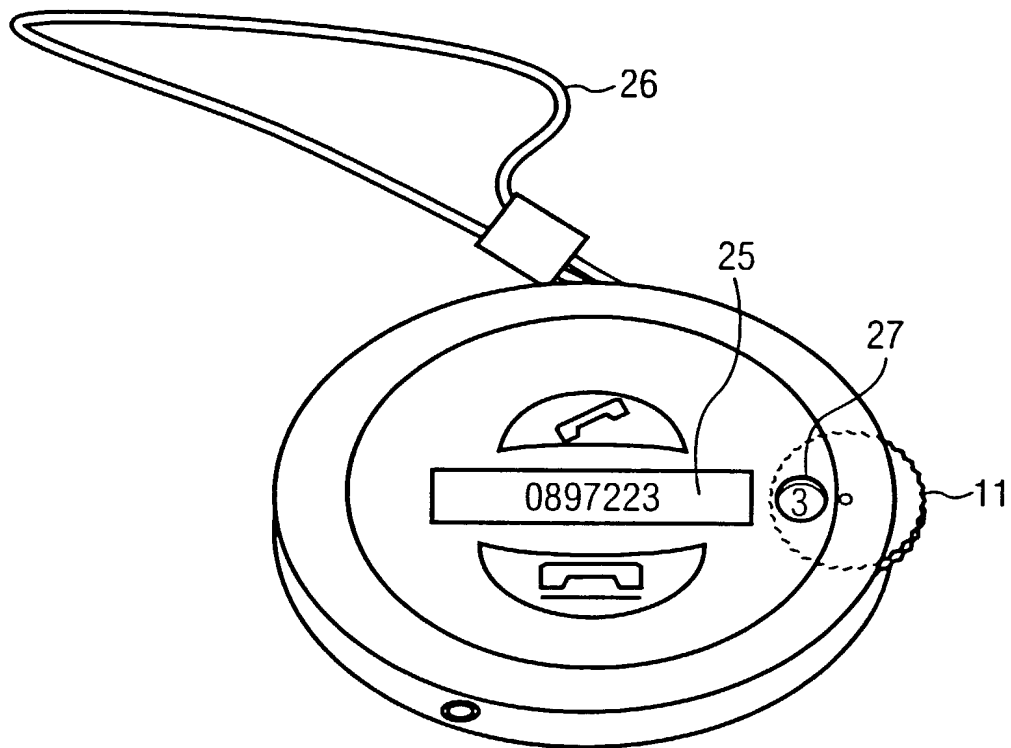
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FIG 5



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FIG 6



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FIG 7

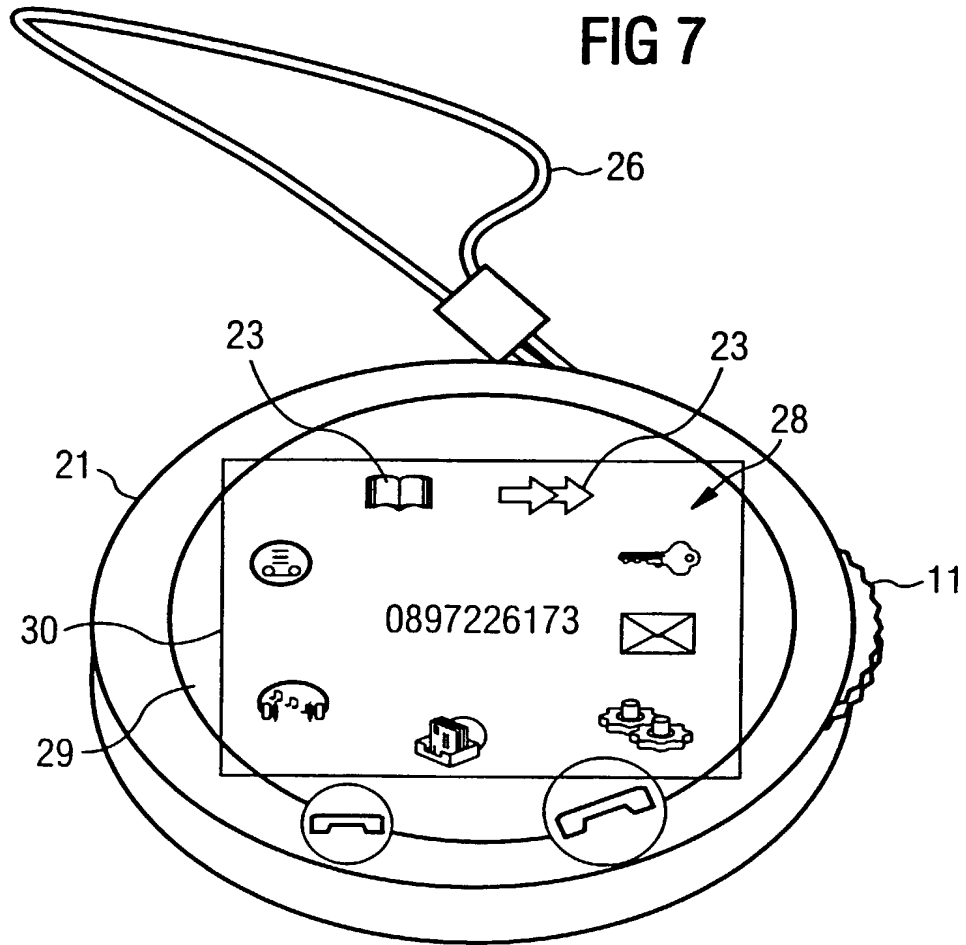
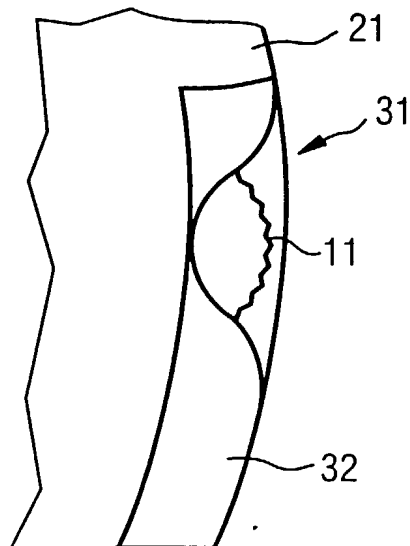


FIG 8



Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

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Eingabeelement für ein Telefon

deren Beschreibung

(zutreffendes ankreuzen)

☐ hier beigefügt ist

☒ am 17.04.2000 als

PCT internationale Anmeldung

PCT Anwendungsnummer PCT/DE00/01202

eingereicht wurde und am _____

abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Input element for a telephone

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on 17.04.2000 as

PCT international application

PCT Application No. PCT/DE00/01202

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign applications
Priorität beansprucht

Priority Claimed

19942448.9

DE

06.09.1999

☒

☐

(Number)
(Nummer)

(Country)
(Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

Yes
Ja

No
Nein

(Number)
(Nummer)

(Country)
(Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☐
Yes
Ja

☐
No
Nein

(Number)
(Nummer)

(Country)
(Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☐
Yes
Ja

☐
No
Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/DE00/01202

(Application Serial No.)
(Anmeldeseriennummer)

17.04.2000

(Filing Date D, M, Y)
(Anmeldedatum T, M, J)

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(Status)
(patentiert, anhängig,
aufgegeben)

pending

(Status)
(patented, pending,
abandoned)

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date D,M,Y)
(Anmeldedatum T, M; J)

(Status)
(patentiert, anhängig,
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(Status)
(patented, pending,
abandoned)

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Customer No. 29177

Voller Name des einzigen oder ursprünglichen Erfinders: Michael Anft	Full name of sole or first inventor: Michael Anft
Unterschrift des Erfinders <i>M. Anft</i>	Inventor's signature
Datum 7.2.02	Date
Wohnsitz Heinrichshofen, DEUTSCHLAND	Residence Heinrichshofen, GERMANY
Staatsangehörigkeit DE	Citizenship DE
Postanschrift Muehlstr. 8	Post Office Address Muehlstr. 8
86492 Heinrichshofen	86492 Heinrichshofen
Voller Name des zweiten Miterfinders (falls zutreffend): Bernd Holz auf der Heide	Full name of second joint inventor, if any: Bernd Holz auf der Heide
Unterschrift des Erfinders <i>B. Holz auf der Heide</i>	Second Inventor's signature
Datum 04.02.2002	Date
Wohnsitz Muenchen, DEUTSCHLAND	Residence Muenchen, GERMANY
Staatsangehörigkeit DE	Citizenship DE
Postanschrift Pennstr.67	Post Office Address Pennstr.67
81549 Muenchen	81549 Muenchen

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(Supply similar information and signature for third and subsequent joint inventors).